

**IN THE SPECIFICATION:**

Please amend the specification as follows:

[0009] The present invention overcomes the disadvantages in the related art for a composite shoddy that eliminates the need for a release liner and accommodates for post-processing material shrinkage of a non-carpeted surface material and a method for manufacturing an improved composite shoddy for use in a vehicle interior. To this end, the composite shoddy of the present invention includes an organic material having a predetermined density defining an organic shoddy bottom layer and a scrim material having a predetermined density defining a scrim top layer. The scrim top layer is adapted to operatively engage a surface material and accommodate movement of a surface material in the shear direction. The composite shoddy further includes a mastic material having a predetermined density defining a mastic middle layer. The mastic middle layer is disposed between the organic shoddy bottom layer and the scrim top layer.

[0020] Referring to Figure 2, the interior floor 16 may include sheet metal 24 and a non-carpeted surface material 32. Accordingly, the non-carpeted surface material 32 includes an “A-side” a “class-A side” 34 that is visible from the vehicle interior 14 and a “B-side” “class-B side” 36 located opposite the A-side 34. The non-carpeted surface material 32 may be formed from any material suitable for use in connection with the intended application. By way of example, material such as

polyvinylchloride (PVC) or thermoplastic polyolefin (TPO) may be employed to form the non-carpeted surface material 32.

[0021] Referring to Figures 2-3, the composite shoddy 10 of the present invention is disposed between the sheet metal 24 and the non-carpeted surface material 32. The composite shoddy 10 is a tri-partite construction including a bottom layer 38 adjacent the sheet metal 24, a top layer 40 adjacent the non-carpeted surface material 32, and a middle layer 42 located between the bottom layer 38 and the top layer 40. As described in greater detail below, those having ordinary skill in the art will appreciate that the bottom layer 38 is constructed from components similar to the above-referenced traditional shoddy flooring substrate. Accordingly, the bottom layer 38 may also be described as the “shoddy bottom layer.” The bottom layer 38 includes an engaging side 44 that operatively engages the middle layer 42, as will be described in greater detail below. The bottom layer 38 of the composite shoddy 10 is constructed from an organic material including a fibrous material. Those having ordinary skill in the art will appreciate that the fibrous material may be resinated. The fibrous material may include any organic material suitable to provide a bottom layer 38 for the composite shoddy 10 such as cotton or wool. Those having ordinary skill in the art will appreciate that the organic material may be needled to provide the organic bottom layer 38. In either event, the organic bottom layer 38 has a predetermined density and includes a predetermined thickness to provide a cushion to improve vehicle interior aesthetics and absorb any irregular contours in the sheet metal 24 from becoming visible along the A-side 34 of the non-carpeted surface

material 32. The predetermined thickness of the organic bottom layer 38 is dependent upon the desired application. By way of example, where the composite shoddy 10 is employed for use in connection with a vehicle floor 16, the predetermined thickness is governed by the available substrate tolerance for a particular vehicle interior 14, considering the thicknesses of the other composite shoddy components as well as the thickness of the non-carpeted surface material 32. However, in the preferred embodiment, the predetermined thickness of the organic bottom layer 38 should not be less than three thousandths of an inch in order to avoid compromising its efficacy.

[0022] As noted above, the composite shoddy 10 of the present invention also includes a middle layer 42 that is secured to the engaging side 44 of the organic shoddy bottom layer 38. Specifically, the middle layer 42 includes a first surface 46 bonded to the engaging side 44 of the organic bottom layer 38 and a second surface 48 that engages the top layer 40 of the composite shoddy 10, as will be described in greater detail below. The middle layer 42 is constructed from a primarily bituminous mastic material and is therefore described as the, “mastic middle layer.” The mastic middle layer 42 has a predetermined density greater than the density of the organic shoddy bottom layer 38 and provides vibration dampening to improve vehicle interior acoustics as well as to block exterior noise from entering the vehicle interior 14 through the organic shoddy bottom layer 38. The thickness of the mastic middle layer 42 is dependent upon the desired application and involves considerations

similar to those described relative to the predetermined thickness of the ~~organic shoddy~~ bottom layer 38.

[0023] Those having ordinary skill in the art will appreciate that the ~~organic shoddy~~ bottom layer 38 may be secured to the first surface 46 of the mastic middle layer 42 through any conventional method. By way of example, the ~~organic shoddy~~ bottom layer 38 may be bonded to the mastic middle layer 42 by applying an adhesive to either the engaging side 44 or the first surface 46 or both. Further by way of example, the ~~organic shoddy~~ bottom layer 38 may be bonded to the mastic middle layer 42 by heating the mastic middle layer 42 such that the first surface 46 becomes tacky and subsequently placing the mastic middle layer 42 over the ~~organic shoddy~~ bottom layer 38. The ~~organic shoddy~~ bottom layer 38 may also be applied soon after the middle layer 42 is formed, while the mastic middle layer 42 is tacky.

[0024] As noted above, the composite shoddy 10 of the present invention also includes a top layer 40 including a contact surface 50 secured to the second surface 48 of the mastic middle layer 42. The top layer 40 further includes a receiving surface 52 opposite the contact surface 50 for engaging the ~~B-side class-B side~~ 36 of a non-carpeted surface material 32. In the preferred embodiment, the top layer 40 is constructed from a non-woven scrim material having a predetermined density which may be less than that of the ~~organic shoddy~~ bottom layer 38 and the mastic middle layer 42. Further, the scrim top layer 40 includes a predetermined thickness which may be less than or equal to five millimeters (5mm).

[0025] When composite shoddy 10 is stored in bulk in a stacking configuration, the scrim top layer 40 serves as a layer that prevents adhesion between the each composite shoddy 10. In this capacity, the scrim top layer 40 eliminates the need for a release liner to be placed between each composite shoddy 10 to accomplish the same end, thereby streamlining secondary handling of the composite shoddy 10. When the composite shoddy 10 is secured to a non-carpeted surface material 32, the scrim top layer 40 also serves as a layer that provides movement in the shear direction, which is particularly important where the composite shoddy 10 is secured to a tacky non-carpeted surface material 32. In this capacity, as the non-carpeted surface material 32 constricts as a result of post-processing material shrinkage, the scrim top layer 40 accommodates for the constriction while maintaining a bond to the non-carpeted surface material 32, thereby reducing the likelihood of undesirable wrinkling that is visible along the ~~A-side class-A side~~ 34 of the non-carpeted surface material 32. To this end, the non-woven scrim top layer 40 is constructed from a material that provides movement in the shear direction while maintaining a bond to the non-carpeted surface material 32. Such material may include nylon, polyester or polyolefin fibers, such as Thinsulate® brand material from Minnesota Mining & Manufacturing Co., St. Paul, Minn. or any other material adapted to provide a similar end result.

[0026] The mastic middle layer 42 and the top layer 40 may be secured together through any conventional method, including those described above relative to securing the ~~organic~~ shoddy bottom layer 38 to the mastic middle layer 42, such as

applying an adhesive or heating the mastic middle layer 42. Further, those having ordinary skill in the art will appreciate that where the conventional method of heating the mastic middle layer 42 or otherwise securing the layers while the mastic middle layer 42 is tacky, the top layer 40 and the organic shoddy bottom layer 38 may be secured to the mastic middle layer 42 either separately or substantially simultaneously.

[0027] As described above, the composite shoddy 10 of the present invention may be employed for use in connection with a non-carpeted surface material 32 as well as other applications within a vehicle interior 14. Where the composite shoddy 10 is employed in connection with a non-carpeted surface material 32, the composite shoddy 10 may be applied without being secured to the B-side class-B side 36 of the non-carpeted surface material 32. However, securing the composite shoddy 10 to the non-carpeted surface material 32 is preferred to prevent movement of either substrate following installation into a vehicle 12.

[0029] The composite shoddy 10 may be secured to a non-carpeted surface material 32 through any number of conventional methods. Where the non-carpeted surface material 32 is formed at a separate location or otherwise not associated with the manufacture of the composite shoddy 10, the non-carpeted surface material 32 may be secured to the composite shoddy 10 through the application of an adhesive to either the B-side class-B side 36 of the non-carpeted surface material 32 or the non-woven scrim top layer 40 of the composite shoddy, or both. The application of

adhesive to secure the composite shoddy 10 to the non-carpeted surface material 32 may also be employed while the non-carpeted surface material 32 is vacuum formed. To this end, the residual heat from vacuum forming compliments the adhesive bond between the composite shoddy 10 and the non-carpeted surface material 32 as the composite shoddy 10 is press fit into contact with the contoured B-side class-B side 36 of non-carpeted surface material 32. Another method involving the introduction of heat to facilitate securing a composite shoddy 10 to a non-carpeted surface material includes heating the non-woven scrim top layer 40 until it becomes tacky and subsequently placing the non-carpeted surface material 32 onto the tacky scrim top layer 40. However, this method of bonding the two substrates may be employed where the application of heat will not compromise the non-woven scrim top layer's ability to provide movement in the shear direction. Alternatively, the composite shoddy 10 may be bonded to the non-carpeted surface material 32 while at least the B-side class-B side 36 of the non-carpeted surface material 32 is tacky, such is the case following the manufacture of non-carpeted surface material 32 via spraying a liquefied polymer into a mold. As the liquefied polymer cools/cures to form the non-carpeted surface material 32, the composite shoddy may be applied to the B-side class-B side 36. The tacky quality of the cooling/curing non-carpeted surface material bonds to the composite shoddy, thereby eliminating the need for an adhesive. However, those having ordinary skill in the art will appreciate that an adhesive may still be employed.

[0030] Those having ordinary skill in the art will further appreciate that several other methods that may be employed to bond the composite shoddy 10 to a non-carpeted surface material 32. By way of example, the non-carpeted surface material 32 may be formed directly on top of the composite shoddy 10, where the composite shoddy 10 is placed into a die and the non-carpeted surface material 32 is extruded thereon. Once extruded onto the composite shoddy 10, the non-carpeted surface material 32 is left to at least partially cool to form and bond to the composite shoddy 10. This method of manufacture may also be employed to bond the layers of the composite shoddy 10 together while forming the non-carpeted surface material 32. Accordingly, the organic shoddy bottom layer 38, mastic middle layer 42, and scrim top layer 40 may be placed in a die in a manner such that the mastic middle layer 42 is disposed between the organic shoddy bottom layer 38 and the scrim top layer 40. In this way, the scrim top layer 40 is disposed in contact with the extruded thermoplastic material. The residual heat from the extruding process will also bond the organic shoddy bottom layer 38 and the scrim top layer 40 to the mastic middle layer 42. As the non-carpeted surface material 32 cools, it will bond to the composite shoddy 10 in-situ.

[0031] The present invention provides a composite shoddy 10 for use in automotive applications having a non-woven scrim top layer 40. Accordingly, the present invention eliminates the need for a release liner between each composite shoddy 10 during storage. Further, the non-woven scrim top layer 40 of the present invention accommodates for post-processing material shrinkage of a non-carpeted

surface material 32 to reduce wrinkling on the ~~A-side class-A side~~ 34, thereby improving the ~~A-side class-A side~~ 34 appearance of a non-carpeted surface material 32. Still further, the present invention provides a composite shoddy 10 for use in automotive applications having a mastic middle layer 42. Accordingly, the present invention provides a sound management and vibration dampening quality to improve the acoustics of a vehicle interior 14. Still further, the present invention provides a method of manufacturing a composite shoddy 10 that reduces the steps the number of steps necessary to manufacture and assemble a composite shoddy 10 to a non-carpeted surface material 32, thereby reducing manufacture and assembly costs.

Please amend the Abstract of the Disclosure as follows:

The present invention relates to a composite shoddy for use in a vehicle interior. To this end, the composite shoddy of the present invention includes an organic material having a predetermined density defining ~~an organic shoddy~~ bottom layer and a scrim material having a predetermined density defining a scrim top layer. The scrim top layer is adapted to operatively engage a surface material and accommodate movement of a surface material in the shear direction. The composite shoddy further includes a bituminous mastic material having a predetermined density defining a mastic middle layer. The mastic middle layer is disposed between the organic shoddy bottom layer and the scrim top layer.